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⑦① Applicant : **OSCAR MAYER FOODS
CORPORATION**
910, Mayer Avenue
Madison Wisconsin 53707 (US)

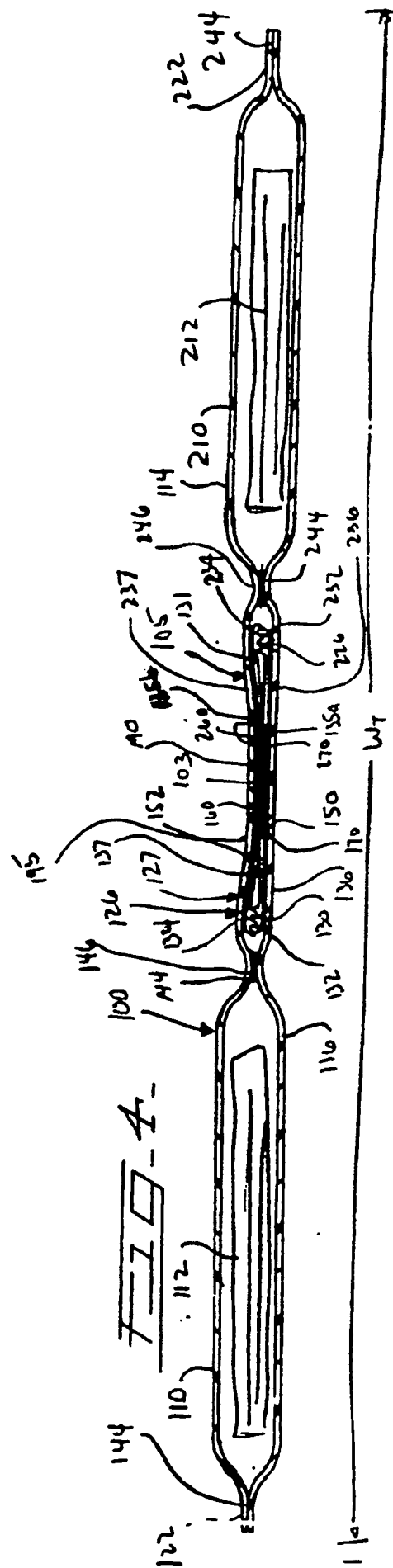
⑦② Inventor : **Hustad, Gerald O.**
4704 Grandview Court
McFarland, Wisconsin 53558 (US)
Inventor : **Lucke, Donald E.**
7340 Old Sauk Road
Madison, Wisconsin 53717 (US)

⑦④ Representative : **Eyles, Christopher Thomas et
al**
W.P. THOMPSON & CO. High Holborn House
52-54 High Holborn
London WC1V 6RY (GB)

⑤④ **Tamper-evident tandem recloseable package and method of making same.**

⑤⑦ A flexible tandem package (100) which can be readily separated into two, distinct recloseable packages (110, 210) and the method for making the same is disclosed. The package includes first and second sheets (116, 114) sealed to opposite surfaces of a double recloseable seal fastener assembly (127). The film sheets (116, 114) are further sealed hermetically together around the periphery (144, 244) of each of the easily separable two distinct packages. Parallel lines of weakening (170, 270) disposed in the central portion of the recloseable seal fastener assembly provide tamper-evident tear strips for each of the two distinct packages (110, 210).

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Background and Summary of the Invention

The present invention relates generally to recloseable packages for hermetically sealing consumable products between generally opposing package side panels, and more particularly to recloseable packages for food products and the like in which each distinct package has its own associated recloseable seal and to a method for manufacturing such packages in tandem.

The freshness of certain processed meats and/or food products such as bacon, sliced luncheon meats, cheeses and the like depends upon the extent to which the food product package is vacuum packed or gas flushed and subsequently hermetically sealed. Often, the purchaser does not use the food products contained within such packages at once, but rather uses them over an extended period of time. When the initial hermetic seal of the package has been breached during opening of the package, a portion or portions of the package are often removed. In such instances, the package cannot be effectively resealed in a manner to preserve the freshness of the food products stored within. The purchaser must often repack the food products in a different suitably recloseable container.

The package of the present invention provides a solution to the above mentioned problem in that it has two distinct package sections each with its own hermetic seal, interior of a package recloseable seal, which extends around the entire periphery of the product so that the recloseable package is liquid tight and suitably retains within the package, fluids of the products contained therein, including water, juices, oils and the like. The recloseable seal is permanently attached at its ends so that each distinct package section can be opened and closed repeatedly to remove portions of the package contents without destroying the integrity of the package. A "zipper" seal consisting of interengaging components such as rib and groove fastener elements is the preferred recloseable seal means.

The recloseable seals associated with each distinct package sections are attached to confronting faces of the packaging films. Interengaging fastener elements of the recloseable seals are provided in pairs each having a central interconnecting web and are adhered directly to the opposing package panels. Each interengaging fastener element is permanently anchored to its respective opposing package panel and is sealed at the opposite ends thereof, which decreases the possibility that the package films may tear or separate when the package section is accessed. Central web portions of the tandem package which separate the two distinct package sections preferably contain a tamper-evident feature in the form of a pair of lines of weakening extending therein which must be broken for the user to obtain access to the two pack-

age section recloseable seals.

The hermetic seal disposed around the periphery of the food product in each package has an easy open or peel seal portion located peripherally adjacent to the recloseable seal. The peel seal is opened with digital pull-apart forces which are also used to open the recloseable seal. The peripheral hermetic seal can maintain a vacuum, pressurized and/or gas-flushed environment within the package. The peel seal area of the hermetic seal will be formed by effecting a face-to-face seal between two plies of plastic film exterior of the product with the strength of the seal permitting separation without destruction or tearing of either ply.

Accordingly, it is a general object of the present invention to provide an improved recloseable package which can be easily manufactured in a continuous length of distinct tandem packages in which each of the two package sections thereof has its own recloseable seal.

Another object of the present invention is to provide a recloseable package which can be easily manufactured in a tandem package assembly wherein each of the tandem packages has a hermetic seal surrounding the packaged product, a recloseable seal exterior of the hermetic seal and a permanently sealed tear strip exterior of the recloseable seal.

A further object of the present invention is to provide a tandem package having two distinct package sections containing a food product portion or the like, each package having a separate recloseable seal associated with each food product portion, the two distinct package section being joined by a package central web portion having lines of weakening associated therewith which define distinct package section tear strips.

Still another object of the present invention is to provide an improved method of manufacturing recloseable product packages in tandem, wherein each package has a peel seal and a recloseable seal, wherein the recloseable seal elements are attached to the first and second package film.

Yet another object of the present invention is to provide an improved method of making recloseable packages in tandem, wherein a double fastener assembly is adhered to confronting surfaces of opposing package panels so as to provide each distinct package with its own tamper-evident tear strip.

These and other objects of the present invention will become more readily apparent from a reading of the following detailed description.

Brief Description of the Drawings

Figure 1 is a perspective view of a package incorporating the principles of the present invention, the package having been separated from a tandem package;

Figure 2 is a cross-sectional view taken along line 2-2 of Figure 1;

Figure 3 is a fragmentary cross-sectional view of the recloseable seal area of Figure 2;

Figure 4 is a cross-sectional view of a tandem package having two distinct, recloseable packages joined by a central web portion prior to separation; and

Figure 5 is an enlarged view of the central web portion of Figure 4.

Detailed Description of the Invention

Figures 4 and 5 illustrate an embodiment of a recloseable package 100 constructed in accordance with the principles of the present invention which is manufactured in tandem and is separated after manufacture along a center line 103 into two distinct counterpart packages 110, 210. The first and second film sheets 116 and 114 which are combined to form the package 100 can be made from a variety of materials including plastic films, multi-layered laminates or co-extrusions, thermoformable materials and the like. A preferred plastic film for assembly of the packages 10 and for use in the method of the present invention is one which is impervious to air, oxygen or moisture.

When the package film sheets 116, 114 are formed from a laminated construction, it is desirable to use a thin, inner layer which is impervious to air, oxygen or moisture in combination with an outer layer having sufficient flexibility and desirable structural characteristics so that the laminate can function as a package sidewall. For purposes of illustration and discussion, each film sheet will be shown as a single heat-sealable lamina. In actual practice, each film sheet will likely be a laminate of two or more layers which will provide sufficient protection to the product (e.g., oxygen and moisture barriers) and which can form a hermetic, and if desired, peelable seal at thin inner surfaces. As is known in the art, a surface of vinylidene chloride polymer plastic films, such as "Saran" in contact with a surface of an ethylene vinyl acetate plastic film, or of a "Surlyn" ionomer in contact with a "Surlyn" ionomer mixture or of a polyethylene in contact with a polyethylene mixture can form such desired bonds.

The tandem package 100 is assembled by advancing a package first film sheet 116 having a width W_1 sufficient to accommodate two separate product portions 112, 212 in two distinct package sections 110, 210. An easily separable two-piece interengaged fastener assembly 127 is applied to the central portion of the first film sheet 116 to form a central web portion 105 of the tandem package 100 and which defines the adjoining two distinct package sections 110, 210. The interengaged fastener assembly 127 includes an elongated first, or lower, fastener element strip 130, which contains two parallel fastener

elements, shown as rib elements 132, 232 extending along the opposite ends thereof. The two first fastener elements 132, 232 are interconnected by a central first fastener element strip integral web 150 so that the first element strip 130 may be extruded as a continuous length. An elongated second, or upper, fastener element strip 131 also contains two parallel fastener elements, illustrated as groove elements 134, 234 which extend along the opposite ends thereof. Similar to the first rib elements 132, 232, the second groove elements 134, 234 are interconnected by a central second fastener element strip integral web 152 which also permits the second fastener element strip to be extruded in a continuous length.

Although illustrated as having double ribs and double grooves, the first and second fastener elements need not be limited to any particular number of interengaging fastener elements or limited in the orientation of the rib and groove elements, i.e., upper or lower. Rather, it is preferred that the fastener elements have a sufficient width and depth to be securely interengaged when assembled to withstand the rigorous handling which commonly occurs during transport, retail display and the like without separating. Additionally, the first and second fastener elements of the double fastener assembly 127 can take any number of various characteristics and configurations in addition to the rib and groove configurations illustrated herein.

The first and second fastener element strips 130, 131 are preferably interengaged prior to applying the double fastener assembly 127 to the first film sheet 116. The interengaged fastener elements of the first and second integral webs 150, 151 provide each of the two distinct package sections 110, 210 with a recloseable seal 126, 226.

Additionally, the first and second webs 150, 151 have a preselected width between the recloseable seal fastener elements which is sufficient to provide a tamper-evident tear strip 160, 260 for each distinct package section as more fully described below. The width of the opposite sides of each of the first and second webs 150, 151, is also wide enough to serve as respective package sealing flanges 135a, 135b which provide the double fastener assembly 127 with respective upper and lower surfaces to adhere the first and second film sheets 116, 114 together. Because the first and second integral webs 150, 151, have respective confronting film sheet portions attached thereto they are thick enough to serve as pairs of package pull flanges 136, 137 and 236, 237 associated with their respective distinct package sections 110, 210. In this regard, the outside surfaces of the two sealing flanges 136, 137 are adhered respectively to the first and second film sheets.

The double fastener assembly 127 may be applied as a unit to the first or bottom film sheet 116 in the form of a continuous strip and trimmed, at a con-

venient time during the manufacturing process, to define the eventual finished package mouth. The separate rib and groove fastener elements 132, 232 and 134, 234 are permanently attached at the ends of the two package section recloseable seals 126, 226 so that the fastener material is not wasted in the trimming of the packages and so that when the recloseable seal is opened, the purchaser cannot disrupt the integrity of the interior hermetic seals 144, 244 of the two distinct package sections 110, 210.

After the double fastener assembly 127 is fitted onto the bottom film sheet 116, and the ends thereof are attached together, two food product portions 112, 212, such as sliced luncheon meat or the like, are positioned on the bottom film sheet 116 in the two distinct package sections 110, 210. The top film sheet 114 is brought into contact with the two food product portions 112, 212, the bottom film sheet 116 and the double fastener assembly second fastener strip 131, and a vacuum is applied therebetween. A first permanent, hermetic seal 144, 244 is formed in the margins 122, 222 surrounding each food product 112, 212 in the two distinct package sections 110, 210. These outer hermetic seals 144, 244 surround each food product portion 112, 212 on three sides. The hermetic seals 144, 244 may be completely extended around the periphery of the two food product portions 112, 212 by forming an inner peelable hermetic seal 146, 246 in each distinct package section 110, 210 interior of the recloseable seals 126, 226 and exterior of the food product portions 112, 212. It is preferable that the inner hermetic seals 146, 246 are secure, yet peelable hermetic seals which maintain a secure seal during handling and storage that can be peeled back upon the application of digital forces applied to the second recloseable seals 126, 226. The top film sheet 114 may then be adhered to the second sealing flange 135b of the double fastener assembly 127, thereby sealing the two product portions 112, 212 into their respective distinct package sections 110, 210.

Means for separating and gaining access to the recloseable seals 126, 226 of the two package section as well as means for indicating prior opening of the package sections are illustrated as parallel lines of weakening 170, 270, which extend longitudinally through the package central web portion 105 between the recloseable seals 126, 226 of the two package sections. The lines of weakening 170, 270 serve as a component of a tamper-evident feature which indicates prior access to the recloseable seals 126, 226. In this regard, it is preferable that the two opposing first and second integral webs 150, 152 are adhered together along the tandem package center line 103, such as by adhesive means, heat sealing or ultrasonic welding. The lines of weakening can be administered to the package central web portion 105 in any suitable manner such as by perforations or scoring. Additionally, either one or both of the first and second

fastener element strips 130, 131 of the double fastener assembly 127 may be provided with a visually distinctive layer such as a relatively bright red layer 190 which is either co-extruded with the fastener element strip, such as the first, or bottom fastener element strip 130, or separately adhered thereto. The colored layer 190 serves to provide each of the two package sections 110, 210 with a visually distinctive appearance when either of the lines of weakening 170, 270 are broken. In this regard, the lines of weakening 170, 270 are exterior of the recloseable seals 126, 226 and interior of the seal between the first and second integral webs 150, 152.

After assembly of the first and second film sheets 114 and 116 to the double fastener assembly 127, the two distinct package sections 110, 210 may be separated from each other along a longitudinal line 103 extending through the center of the package central web portion 105 between the recloseable seals 126, 226.

When it is desired to open a finished package, the user grips the package and tears off the tear strip 160 along the line of weakening 170 and exposes a package mouth 195 to gain access to the inner second recloseable seal 126. The excess material of the first and second integral webs 150, 151 extending from the respective fastener elements 132, 134 up to the package mouth 195 serves to provide package pull flanges 136, 137 of substantially similar length which are gripped by the user for applying digital pull apart forces thereto in order to open the recloseable seal 126 of the package section 110. The recloseable seal interengaged fastener elements 132, 134 will separate and open to form a package section mouth 195, thereby allowing access to the inner peelable hermetic seal 146 and the food product portion contained thereby.

Figures 1-3 illustrate a package 10 which has been removed from its counterpart package by separating the two along the central web portion center line 3. The top and bottom film sheets 14, 16 cooperatively enclose a food product portion 12 positioned on the first film sheet 16. The food product 12 or the like is desirably positioned on the first film sheet 16 to provide a peripheral margin 22 surrounding it. The film sheets 14, 16 contact each other around the food product 12 to form a continuous edge seal 24 extending around the periphery of the food product.

The package 10 has a first recloseable seal 26 disposed above a second, inner peelable hermetic seal 46. The recloseable seal 26 includes a pair of fastener strips 28, 29 with interengaging fastener elements 32, 34 adhered to confronting faces of the first and second film sheets 14, 16. The rear surfaces of the interengaging fastener strips 28, 29 each intrude film sealing surfaces 35a, 35b which extend transversely to the fastener strips 28, 29 and which are sealed to the package film sheets 14, 16 by any suit-

able means such as heat sealing or adhesive sealing. The sealing flanges 35a, 35b of the interengaging fastener elements 28, 29 are sufficiently wide so that each flange has a large enough surface to adhere to the package film sheets and to serve as package pull flanges 36, 37 to assist the user in separating the recloseable seal fastener elements of the finished package.

The two sealing flanges 35a, 35b extend up to and terminate at the package top 65. A line of weakening 70 is disposed parallel to and interior of the package top 65 and defines a tear strip 60 extending at or slightly exterior of the line of weakening 70. The two sealing flanges 135a, 135b may be sealed together along the tear strip 60. Either or both of the sealing flanges 135a, 135b may include a colored layer, shown as a red portion, in the package area above the line of weakening 70.

To open the package 10, the user grips the tear strip 60 along the package top 65 and tears it off along the line of weakening 70. The package mouth 62, which is formed by the opposing fastener element sealing flanges 35a, 35b is accessed and the user grips the free edges of the pull flanges 36, 37 and applies digital pull apart forces to open the recloseable seal 26. Further exertion of digital forces will separate the peel seal portion 46 of the hermetic seal 44, thereby allowing access to the package contents 12. The recloseable seal 26 is permanently secured together at its ends 80 so that the likelihood of destruction of the integrity of the package 10 is greatly diminished.

Manufacture of the packages of the present invention is greatly simplified in that the three major package components, namely, the first or bottom package film 116, the double fastener assembly 127 and the second or covering package film 114 can be supplied to one or more package assembly stations in a continuous fashion to assemble, if desired, a continuous length of tandem packages which can then be separated into separate tandem packages 100 and further separated into individual packages.

It will be seen that while certain embodiments of the present invention have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made therein without departing from the true spirit of the scope of the invention.

Claims

1. A method of making tamper-evident recloseable packages in tandem, each package containing a product between first and second sheets of packaging material, the method comprising the steps of:

providing a first film sheet of a width suffi-

cient to provide two continuous package sections on said first film sheet, the two package sections being separated from each other by a first film sheet central web portion;

applying a double fastener strip assembly to said first film sheet central web portion, wherein said double fastener strip assembly has a first double fastener element strip having separate first interengaging fastener elements interconnected by a first integral web, and a second double fastener element strip having separate second interengaging fastener elements interconnected by a second integral web, the second interengaging fastener elements being interengaged with said first interengaging fastener elements, the first and second integral webs having respective first and second sealing flanges disposed on opposite sides thereof of their respective integral webs, said double fastener strip assembly being adhered to said first film sheet central web portion by at the entire double fastener assembly first integral web package sealing flange, each of said interengaged first and second fastener elements providing a recloseable seal for each of said two package sections;

placing a product portion onto said first film sheet in each of said two package sections on opposite sides of said double fastener strip assembly,

providing a second film sheet having a width at least equal to that of said first film sheet and attaching the second film sheet by adhering the entire double fastener assembly second integral web package sealing flange to said second film sheet;

contacting said first and second film sheets with each other at a hermetic seal area adjacent to and around the periphery of each of said two products to create a hermetic seal interior of the recloseable seal of each of said two package sections, the hermetic seal completely enclosing each of said two product between said first and second film sheets, wherein said hermetic seal includes at least one peelable bond area adjacent to each recloseable seal of each said package section; and

forming two lines of weakening in said first film sheet central web portion, each of the two lines of weakening defining a tear strip associated with each of said two package sections, said two lines of weakening passing through said first and second fastener element strip integral webs exterior of said first and second fastener elements.

2. The method of claim 1, wherein said first and second integral web package sealing flanges are adhered to said first and second film sheets by

adhesive means.

3. The method of claim 1, wherein said first and second integral web package sealing flanges are adhered to said first and second film sheets by heat sealing means. 5
4. The method of claim 1, wherein said first and second double fastener element strips include interengaging rib and groove fastener elements. 10
5. The method of claim 1, further including the step of vacuum packing said product between said first and second film sheets. 15
6. The method of claim 1, further including the step of separating said tandem recloseable package into two separate package sections along a longitudinal line of said double fastener assembly midway between said two recloseable seals. 20
7. The method of claim 1, further including the step of forming a visually distinctive portion in a central portion of said double fastener assembly. 25
8. The method of claim 1, further including the step of gas flushing each of said two package sections.
9. A method of making a recloseable package in tandem, comprising the steps of: 30
 - providing a continuous length of a first package panel, the first package panel having a width sufficient to provide two counterpart package portions separated by a first package panel central web portion; 35
 - providing a continuous length of double fastener assembly, the double fastener assembly having a first double fastener strip having two interengaging fastener elements disposed along opposite sides of and interconnected to a first integral web, said double fastener assembly further having a second double fastener strip having two interengaging fastener elements disposed along opposite sides of and interconnected to a second integral web, said first and second interengaging elements strips being interengaged with each other, each of said first and second fastener elements having a sealing flange disposed on a side opposite that of said respective interengaging fastener elements to provide two recloseable seals in said first package panel central web portion; 40
 - adhering said continuous first package panel along the entire width of said first fastener element sealing flange; 45
 - providing a continuous length of a second package panel, the second package panel having a width approximately equal to said first package panel width; 50
 - adhering second package panel continuous length to said first package panel continuous length, and adhering said second package panel continuous length to said second fastener element sealing flange so as to provide each of the two counterpart package portions with a permanent hermetic seal around part of the perimeter of each of said two counterpart package portions and a peelable hermetic seal around the remainder of the perimeter of each of said two counterpart package portions; 55
 - applying two lines of weakening to said double fastener assembly, each of the two lines of weakening being disposed generally parallel to and exterior of the two recloseable seals; and,
 - severing said continuous lengths of said first and second package panels at preselected intervals to define individual tandem, recloseable packages.
10. The method of claim 9, further including the step of separating said individual, tandem recloseable packages into two separate recloseable packages by separating said two counterpart package portions along a longitudinal line of said double fastener assembly disposed between said two lines of weakening.
11. The method of claim 9, further including the step of applying a visually distinct portion to one of said first or second double fastener integral webs, the visually distinct portion extending generally along the centerline of said double fastener assembly and proximate to said two lines of weakening.
12. The method of claim 9, further including the steps of adding a product to each counterpart product portion of said tandem package and vacuum packing said product between said first and second package panels.
13. The method of claim 9, further including the step of gas flushing each counterpart product portion of said tandem package.
14. A tandem recloseable product package, each tandem recloseable package having a tamper-evident tear strip associated therewith comprising:
 - a base film sheet having a width sufficient to provide two recloseable package sections; 60
 - an elongated double fastener assembly extending longitudinally across said film base sheet in approximately the center of the base film sheet, the double fastener assembly including a first, lower fastener element strip having a pair of

elongated first interengaging fastener elements disposed on opposite sides thereof, the pair of first interengaging fastener elements being interconnected by a first integral web and a second, upper, fastener element strip having a pair of elongated second interengaging fastener elements disposed on opposite sides thereof, the pair of second interengaging fastener elements being interconnected by a second integral web, the first and second pairs of interengaging fastener elements being interengaged with each other, each of said first and second fastener element strips having respective sealing flanges on opposite surfaces thereof;

a cover film sheet adhered to said second fastener element strip sealing flanges so as to form two recloseable seals associated with said two recloseable package sections, the cover film sheet further being adhered to said base film sheet around the periphery of each of said two recloseable package sections and interior of said two recloseable seals so as to for a hermetic seal which completely encloses each of said package sections, the hermetic seal including at least one peelable bond area interior of and adjacent to each of said two package section recloseable seals;

said double fastener assembly including two elongated line of weakening disposed generally parallel to and exterior of said two package section recloseable seals, the two elongated lines of weakening defining two package section tear strips; and

said tandem recloseable package being adapted to be longitudinally separated between and spaced from said recloseable seals.

15. The tandem recloseable package of claim 14, wherein said double fastener assembly includes a visually distinctive portion.
16. The tandem recloseable package of claim 14, wherein the peelable bond area of said hermetic seal is formed by adhesive means.
17. The tandem recloseable package of claim 14, wherein said peelable bond area of said hermetic seal is formed by heat sealing means.
18. The tandem recloseable package of claim 14, wherein said first and second interengaging fastener elements include interengaging rib and groove elements.
19. The tandem recloseable package of claim 14, wherein said package is for enclosing perishable food products.

20. A recloseable, flexible, tandem package for hermetically sealing a food meat product in two distinct, easily separable product packages, each of the two distinct packages having its own distinct recloseable seal to permit periodic access to the package after initial opening of said package, comprising, in combination:

two opposing, flexible, oxygen-impermeable package sidewalls, the package sidewalls intruding first and second sheets of package film contacting each other and bonded together to define said two distinct packages hermetically bonded at three sides and having a fourth side containing a package mouth portion, elongated double continuous recloseable fastener means forming two recloseable seals generally parallel to each other, each of said two recloseable seals being disposed at separate respective mouth portions of said two distinct packages, the double continuous fastener means including two double strips of first and second interengaging fastener elements interconnected by respective first and second integral webs, the strips of first and second interengaging fastener elements being adhered to the opposing package side walls by way of said first and second integral webs thereof and proximate to said package mouth portion to form a hermetic peelable seal adjacent to and interior of said recloseable fastener means, the double continuous fastener means and said first and second film sheets respectively bonded thereto having two parallel lines of weakening extending therein, said two lines of weakening defining two package tear strips, said double continuous fastener means including means for separating said tandem package into two packages.

21. The recloseable package of claim 20, wherein said food meat product is vacuum packed between said first and second film sheets.
22. The recloseable package of claim 20, wherein said first and second interengaging fastener element package sealing flanges are bonded to said first and second film sheets by adhesive means.
23. The recloseable package of claim 20, wherein said first and second interengaging fastener element package sealing flanges are bonded to said first and second film sheets by heat sealing means.
24. The recloseable package of claim 20, wherein said double continuous fastener means includes a visually distinctive portion.
25. The recloseable package of claim 20, wherein

said double continuous fastener means includes a visually distinctive portion, the visually distinctive portion being disposed between said two lines of weakening.

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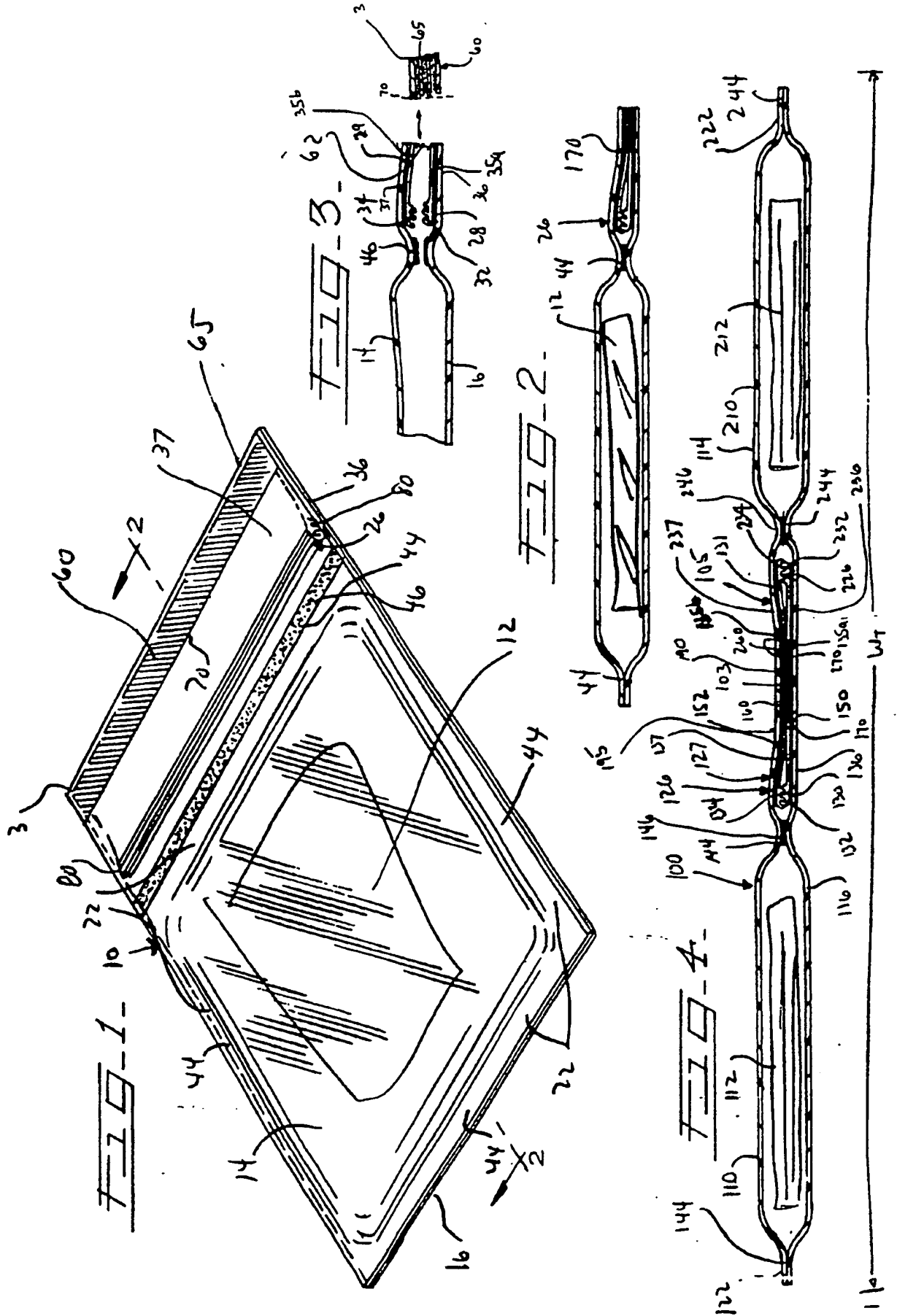
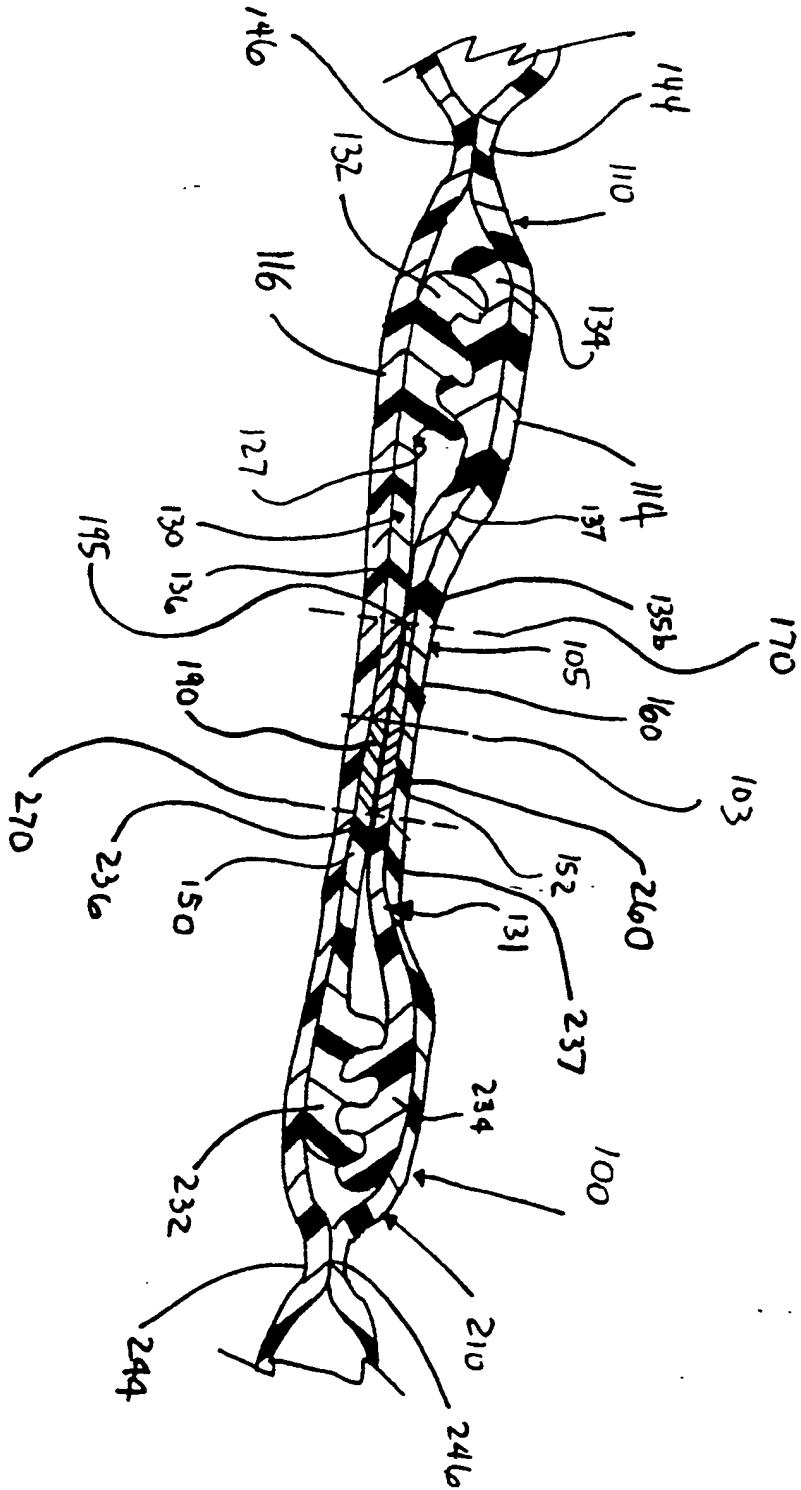


Fig. 5





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 30 4481

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	US-A-4 923 309 (VAN ERDEN) * the whole document *	1-25	B65D33/25 B65B61/18
Y	FR-A-2 329 439 (FLEXICO-FRANCE) * page 13, line 1 - page 14, line 29 * * page 15, line 36 - page 16, line 36; figure 9d *	1-25	
Y	US-A-4 246 288 (SANBORN, JR) * the whole document *	5, 8, 12-13, 21	
A		1, 3, 4, 6, 9, 10, 14, 18-20, 23	
Y, P	EP-A-405 995 (OSCAR MAYER FOODS CORPORATION) * the whole document *	7, 11, 15, 17, 24, 25	
A		1, 3, 4, 5, 9, 12, 14, 18-21, 23	TECHNICAL FIELDS SEARCHED (Int. Cl.5)
Y	CA-A-1 265 104 (BECKETT) * page 4, line 1 - line 8 *	16	B65D B65B B31B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 22 AUGUST 1991	Examiner BRIDAULT A.A.Y.
CATEGORY OF CITED DOCUMENTS		I : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application I : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

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